



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/510,512

10/07/2004

Katsuhiko Takahashi

Q83567

8886

23373 7590 06/09/2008  
SUGHRUE MION, PLLC  
2100 PENNSYLVANIA AVENUE, N.W.  
SUITE 800  
WASHINGTON, DC 20037

EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/09/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



#### **DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/24/2008 has been entered.

Applicant's amendment and arguments filed 03/24/2008 have been entered and fully considered. Claims 1-2 were amended. Claims 1-15 as amended are pending with the application.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure in the specification enables for "a particulate silver compound," while it does not enable for "a silver containing component" comprising a particulate silver compound that is broader than the original disclosure (Spec. Pg-12, Ex-12).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims recite the limitation of "silver containing component" in lines 1-2 that is not disclosed in the specification, and a person of ordinary skill in the art will not know what materials are included by this limitation and hence the boundaries of this limitation.

The examiner construes this limitation to encompass particulate silver compound/s based on the disclosure in the specification for the purposes of the examination.

***Claim Rejections - 35 USC § 102***

***Claim Rejections - 35 USC § 103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-6 and 9-15 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kudas et al (US 2003/0124259).

Kudas et al teach a precursor composition comprising a dispersion of a molecular metal precursor such as silver oxide, silver acetate, or silver salts in vehicles such as terpineol, toluene or ethylene glycol. The precursor composition further contained binders such as ethyl cellulose, epoxy, phenolic resin and polyester. The nanoparticles were coated with polymers such as polystyrene/methacrylate. The particles further included composites such as metal/polymer. The agglomerates of particles were dispersed in the medium by ultrasonic or high shear mixing or 3-roll mill forming primary particles. The molecular metal precursors were present as a combination of nanoparticles with a particle size not greater than 100 nm and micron particles with a with a particle size not less than 0.3 micron and not greater than 10 microns (Abstract, Para 0024, 0032, 0037, 0045, 0053, 0081, 0098-99, Pg-5, Table-1, Pg-9, Table-4, Para 0102, 0104, 0115, 0140). The ratio of binder in specific examples ranged from 0.83-2.2 parts of cellulose per 100 gm of the silver salt that meets the ratio limitations in the claims 1-2 (Para 0273-0275, 0280). With regard to claim-10, the prior art teaches a viscosity of 1000 cps <10 dPa.sec> and at least about 10,000 cps <100 dPa.sec> (Para 0022).

With regard to the claims 11-14, the prior art teaches coating the surface of substrate with the precursor composition, and converting it fully in to solid conductive traces with low resistivities approaching that of metallic silver at temperatures not greater than 185C (Para 0179, 0200, 0273-0275, 0278, Table-06). All the limitations of the instant claims are met.

The reference is anticipatory

In the alternative that the disclosure by Kudas et al be insufficient to anticipate the limitations of instant claims, it would have nonetheless been obvious to the skilled artisan over the prior art disclosure to produce the claimed composition, because the reference teaches each of the claimed ingredients within the claimed proportions for the similar utility of making conductive traces. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 619 F.2d 67, 205 USPQ594 (CCPA 1980).

2. Claims 7-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudas et al (US 2003/0124259).

The disclosure by Kudas et al on the composition and the coating as set forth in rejection-1 under 35 USC 102(e)/103(a) is herein incorporated. The prior art teaches using polyester binder in the resin and the common one is polyethylene terephthalate (Para 0140). The prior art also teaches the use of polystyrene and coating the nanoparticles with polymers such as polystyrene (Para 0045) and further teaches printing the composition over low temperature substrates such as polyester (Para 0157).

The prior art is silent about the particle size of the polymer per the claim-7 and viscosity range per claim-10.

Kudas et al teach compositions containing the same components in same proportions as claimed and has the same common utility in forming conductive traces, and further discloses the use of nano and micron sized particles, wherein the nanoparticles had a particle size of not more than 100 nm (P-0024, 0028, 0038) and micron sized particles had a particle size of about 0.3 micron to 3 micron (P-0035), and further, teaches coating nanoparticles with a polymer and prima-facie obviousness over the instant

Art Unit: 1793

claimed particle size. Also the prior art teaches optimizing particle size distribution (P-0038) in the composition, and It would have been obvious to a person of ordinary skilled in the art to optimize the particle size of the components including polymer in the dispersion by routine experimentation as a choice of design of the coating conditions with reasonable expectation of success, and Generally, differences in concentration, viscosity, particle size, period or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration, viscosity, particle size, period or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955), See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

With regard to claim-10, the prior art teaches compositions containing the same components in same proportions as claimed with a viscosity of 1000 cps <10 dPa.sec> and at least about 10,000 cps <100 dPa.sec> (Para 0022) and it would have been obvious to a person of ordinary skilled in the art to optimize the viscosity as a choice of design of the printing technique for the ink/paste with reasonable expectation of success because they have the same common utility of forming conductive traces over substrates at low temperatures, and Generally, differences in concentration or temperature or viscosity will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature or viscosity is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

3. Claims 1-2, 5-8, 10-11 and 13-14 are rejected under 35 U.S.C. 102(e) as anticipated or, in the alternative, under 35 U.S.C. 103(a) as obvious over Conaghan et al (US 2004/0144958).

*Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.*

Art Unit: 1793

Conaghan et al teach the composition of a conductive ink comprising a mixture of silver flake, silver metalloorganic compound, neodecanoic acid, dipropylene glycol methyl ether<DPGME> <reducing agent> and a polymer such as epoxy or polyester, and the ink compositions in Examples 4-14 meet the ratio of polymer to silver flake and salt combined (silver component) in the claims, and "[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is anticipated' if one of them is in the prior art." *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (citing *In re Petering*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA 1962)) (emphasis in original). The various adhesion promoters in Para-0008 and 0017 meet the limitation of binder/s in claims 1-2, 5-6 and 8. The terpineol and DPGME solvents meet the limitation of reducing agent in claim-2. The latexes/DARAN meets the particle size of polymers in claim-7. The viscosity ranged from 50 cp to 100,000 cp based on the method of printing and a value of 3,000 cp (30 dPa.sec) for rotary screen printing anticipates the viscosity in claim-10. With respect to method in claims 11-14, the prior art teaches printing the ink composition over polymer substrates and curing at 150C forming conductive traces (P-0038). All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Conaghan et al be insufficient to anticipate the limitations of instant claims, it would have nonetheless been obvious to the skilled artisan over the prior art disclosure to produce the claimed composition, because the reference teaches each of the claimed ingredients within the claimed proportions for the similar utility of making conductive traces. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 619 F.2d 67, 205 USPQ594 (CCPA 1980).

4. Claims 3-4, 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conaghan et al (US 2004/0144958) in view of Kudas et al (US 2003/0124259).

The disclosure on the ink composition and its printing over polymeric substrates by Conaghan et al as set forth in rejection-3 under 35 USC 102(e)/103(a) is hereby incorporated.



The prior art fails to teach the silver compound to be silver oxide per claims 3 and 15, or the particle size of the silver compounds per the claim-4 or the specific solvents per the claim-9.

In the analogous art, Kodas et al teach a precursor composition comprising a dispersion of a molecular metal precursor such as silver oxide, silver acetate, silver neodecanoate or silver salts in vehicles such as terpineol, toluene or ethylene glycol. The precursor composition further contained binders such as ethyl cellulose, epoxy, phenolic resin and polyester. The molecular metal precursors were present as a combination of nanoparticles with a particle size not greater than 100 nm and micron particles with a with a particle size not less than 0.3 micron and not greater than 10 microns (Abstract, Para 0024, 0032, 0053, 0081, 0094-0098, Pg-5, Table-1, Pg-9, Table-4, Para 0102, 0140). The amount of a binder was in specific examples ranged from 0.83-2.2 parts of cellulose per 100 gm of the silver salt that meets the ratio limitations in the claims 1-2 (Para 0273-0275, 0280). The prior art teaches a viscosity of 1000 cps <10 dPa.sec> and at least about 10,000 cps <100 dPa.sec> (Para 0022). The prior art teaches coating the surface of substrate with the precursor composition, and converting it fully in to solid conductive traces with low resistivities approaching that of metallic silver at temperatures not greater than 185C (Para 0179, 0200, 0273-0275, 0278, Table-06).

It would have been obvious to a person of ordinary skilled in the art to substitute the silver salt in the ink composition of Conaghan with either silver oxide or acetate or carbonate of Kodas et al as functional equivalent with reasonable expectation of success because the genus of silver salts of Kodas et al encompasses the species of silver neodecanoate of Conaghan, and they have the same common utility of forming conductor patterns at low temperatures over the polymeric substrates. The particle size of the silver compounds will be obvious over the particle sizes taught by Kodas et al.

Further, It would have been obvious to a person of ordinary skilled in the art to substitute the solvents in the ink composition of Conhagen with ethylene glycol of Kodas et al as functional equivalent with reasonable expectation of success because the genus of solvents of Kodas et al encompasses the terpineol/DGPME of Conhagen and they have the same utility as forming conductor patterns at low temperatures over the polymeric substrates.

Art Unit: 1793

5. Claims 4, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conaghan et al (US 2004/0144958).

The disclosure on the ink composition and its printing over polymeric substrates by Conaghan et al as set forth in rejection-3 under 35 USC 102(e) is hereby incorporated.

The prior art is silent about the particle size of silver MOD/compound per claim-4 and particle size of resins per claim-7, and the fails to teach the viscosity per claim-10.

The prior art ink composition contains same the components in the same proportions as claimed by the instant claims, and instant claimed particle size per claims - 4 and 7 would be obvious over the ink containing particles smaller than 1 micron (P-0020, 0041).

With regard to claim-10, the prior art teaches varying the viscosity in the range of 1 cp to 100,000 cp based on the method of printing the ink (P-0022), and it would have been obvious to a person of ordinary skilled in the art to optimize the viscosity as a choice of design of the printing technique for the ink with reasonable expectation of success, because they have the same common utility of forming conductive traces over substrates at low temperatures, and Generally, differences in concentration or temperature or viscosity will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature or viscosity is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

Art Unit: 1793

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1, 4-10 and 14-24 of copending Application No. 10/500,124 <as amended on 11/30/2007> in view of Kodas et al (US 2003/0124259).

Both the claims of the instant application and the copending application are drawn to similar conductive compositions with similar utility, wherein the independent instant claims 1-2 differ from the copending application in not specifying the particle size of the silver compound, and requiring a binder in a specific range. The particle size of the silver compound in the conductive paste for making conductive traces, and the addition of a binder to a conductive paste composition in specific ranges would have been obvious to a person of ordinary skill in the art for the purposes of adhesion of conductive particles to a substrate forming solid conductive traces in view of Kodas et al that clearly teaches the addition of binders to composition containing nanoparticles of metal/silver precursor compounds in making solid conductive traces over a substrate with low resistances (Para-0140). Further, the limitation of comprising in the copending application does not exclude addition of such binders/reducing agents in the composition.

This is a provisional obviousness-type double patenting rejection.

### ***Response to Arguments***

Applicant's arguments filed with the amendment filed 03/24/2008 have been fully considered. In response to the argument that that ratio of binder to silver containing component in Kodas should include metallic silver component is not persuasive (Res, Pg-5, Last Para – Pg-6, Last Para) and it has been addressed in the rejection of claims under 35 USC 112-I/II-Paragraphs. Further, the applicants cited

Art Unit: 1793

sections in (Spec, Pg-13, Ex-2) disclose the silver compounds/oxide as the particulate silver compound, Applicants define the particulate silver compound used in a conductive composition of the present invention is a solid particulate compound which reduces to become metallic silver under simple heating, or heating in the presence of a reducing agent. (Spec, US 20050116203: P-0019), metallic particles do not meet this criteria, and the ratios between the silver compound and the binder in the examples by Kodas anticipate the claimed ratio, because "[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is anticipated' if one of them is in the prior art." *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (citing *In re Petering*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA 1962)) (emphasis in original).

For the reasons set forth above, applicant's fail to patentably distinguish their composition over the prior art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/  
June 5, 2008.

/Stanley Silverman/  
Supervisory Patent Examiner, Art Unit 1793